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4 February 1955

**MEMORANDUM FOR THE RECORD****SUBJECT:** Speech Fabrication**REFERENCE:** Memorandum for DCI, dated 12 October 1954, subject:  
"Sound Modulation"

1. At a meeting of the Communications Working Group of the DD/P Materiel Board on 3 February 1955 to consider the advisability of CIA developing and utilizing the speech fabricating equipment described in referenced memorandum, certain questions regarding the practicality of the project were discussed.

2. Below is a summary of the discussion at the meeting of the technical aspects of the development.

3. In the fabrication of speech prior experimenters have been able to fabricate speech by the manipulation of sound into the general inflections of speech. Such fabrications are understandable as words but are short of complete verisimilitude to human speech. One of the principal reasons for the deficiencies of such fabricated speech is the absence in the fundamental sound producing mechanism (usually oscillator tubes) of sounds resembling consonants, hisses and slurs that are present in normal human speech.

4. In reproducing speech on film the vibrations of the voice activate a microphone which in turn activates a light valve that exposes moving raw film to light variations directly corresponding to the vibrations of the voice. Thus all sounds, regardless of characteristics, vowels, consonants, hisses, rising and lowering inflections, etc. show up on the film as variations of black and white. Using the unilateral variable area sound track method the sound track will look something like this:



DOCUMENT NO. \_\_\_\_\_  
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NEXT REVIEW DATE: \_\_\_\_\_  
AUTH: HR 70-2  
DATE: 8/10/81 REVIEWER: 037169

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5. Every sound variation and characteristic thereof striking the microphone is represented by a variation in the light and dark areas on the film. Consequently if one specific person speaks a phrase such as "It is later than you think" into the microphone it will show up as a specific pattern of black and white on the film. If desired, copies of this sound film can be made photographically and when these copies are passed through an audio system the result will sound exactly like the original speaker.

6. The problem then is to develop procedures whereby copies can be made manually by painting identical light and dark serrations on a clear film strip. Then if this can be done as a next step it should be possible, with practice, for the fabricator to rearrange the words in any order he desires, still retaining the characteristics of the speech that would definitely identify the speaker as the one who made the original statement. With this accomplished it is reasonable to assume that the fabricator can emphasize any word or syllable desired.

7. Outright fabrication of a word of which you do not have a recorded sample, spoken by the person to be imitated, for analysis might be possible by combining known syllables but this would probably never be necessary. Operations officers will probably be able to obtain true recordings of every person's speech it would be desirable to imitate. Then any fabricated speech could be written within the framework of words used in the true recordings.

8. It would make no difference whether the true recordings were on tape, wire or wax as they could be easily transferred to a sound film strip for visual analysis.

9. In analyzing sound film strips difficulties may be encountered because of the small size (width) of sound film strips presently in use. These can be enlarged photographically but in such enlargement some detail will be lost. Whether this loss would be sufficient to impair the distinctive characteristics of a specific voice could only be determined by trial. To minimize the loss of detail through enlargement it is believed that the best method would be to develop the true voice on a sound film strip the entire width of a 16 mm or 35 mm film. Ideally it should be the same width as the clear film on which fabrications are painted.

10. If further difficulties are encountered in seeing the vibrations as recorded on film traveling at normal speeds of 18 inches per second, the film speed in recording the true speech could be doubled or otherwise varied to assure the most legible vibration markings.

11. The above procedures may have some flaws but in light of presently available information it appears theoretically possible that the fabrication

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of human speech with complete versimilitude of any desired person's speech can be accomplished and when it is accomplished it will be a valuable addition to CIA's capabilities.

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